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Integrate, Don't Isolate! Computers in the Early Childhood Curriculum. ERIC Digest.

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Despite the promises and predictions made by educational researchers in the early 1980s, computers have not revolutionized education overnight, and few schools have invested wholeheartedly in instructional technology. Instead, in an effort to provide computer access to all students at an affordable cost despite the low ratio of computers to students, and because some critics feel there is a lack of quality software or that technology is too complex (Maddux, 1991), schools have often put computers in a single room where children use them once a week under a specialty teacher's supervision.

Unfortunately, this practice has undermined the most valuable aspect of the computer--its ability to cut across traditional subject boundaries as a practical and useful tool. Papert (1993) compares the isolation of computers in labs to the body's immune response to a foreign intruder; by removing computers from the classroom and relegating them to an isolated lab, schools have effectively minimized the potential impact computers can have on children's learning by turning the technology into a separate, unrelated subject area called "computer literacy." In this lab approach, Papert further argues, students have access to about 1/50th of a computer in school, far from the critical level needed for this technology to have a major impact on educational practices or learning experiences of children. The fatal flaw in taking computers out of the classroom is that any information learned about the computers today will be obsolete by tomorrow (Papert, 1993). Only when computers are integrated into the curriculum as a vital element for instruction and are applied to real problems for a real purpose, will children gain the most valuable computer skill--the ability to use computers as natural tools for learning (Shade & Watson, 1990).

INTEGRATED LEARNING SYSTEMS VERSUS TRUE INTEGRATION

The term "integrated learning" has gained popularity over the past half-decade, evidenced by the appearance of numerous prepackaged reading, math, and science curricula on the pages of educational software catalogs. Unfortunately, these well-marketed packets are often no more than unrelated activities clustered around a single topic and give little consideration to the development of larger concepts or goals (Routman, 1991).

These misnamed integrated learning systems view a topic, such as dinosaurs or planets or fish, as only a series of superficially related activities and isolated skills linked casually together in sequence, much as a worm appears to be no more than a chain of loosely attached segments that can be severed and still function independently. Real knowledge is much more than a group of unrelated segments; each section supports a particular function, and all are related to one another. If the severed pieces are thrown into a box (brain) and shaken up without the support of their natural connections, neither the worm nor deep understanding will grow.

True integration respects the interrelationships of the disciplines--language, mathematics, science--as natural and necessary to achieving the goal of becoming educated about a particular topic. As in the "project" approach (Katz & Chard, 1989), children exercise all the developmental or curricular domains as they complete self-initiated projects individually or in small groups. For example, if the teacher selected the topic "Fish" for integrated study, the first step in planning might be to define several central concepts about fish that are meaningful and relevant to the students' lives. Next, activities might be chosen based on the desire to further explore these concepts. The teacher would then determine the most effective medium for supporting the activities selected. Sometimes computers will be the most appropriate material for concept exploration; at other times, they will not. Computers, like any learning material, are neither panacea nor pernicious (Clements, 1987).

EXAMPLES OF COMPUTER USE IN INTEGRATED CURRICULA

When exploration of a concept encourages students to write letters, stories, poems, or reports, using a word processor allows children to compose, revise, add, and remove text without being distracted by the fine motor aspects and tedium of forming letters. Research demonstrates that children who write on word processors compose longer and more complex stories, are less worried about mistakes, and are more willing to revise (Clements & Nastasi, 1993; Feeley et al., 1987).
The teacher implementing the unit on "Fish," for example, might use the KID PIX program with very young children to construct a story through pictures and labels that can be narrated in the child's own voice by recording through the computer's microphone. With KID WORKS2, students might write and draw what they have learned about fish and hear their composition read back. Slightly older students could use CD-ROM encyclopedias to gather data and STORYBOOK WEAVER to compose and illustrate original stories and reports about their topic. MY WORDS, a simple program, can be used to write letters to local experts asking for information or extending an invitation for a classroom visit. Any one of these programs provides an excellent medium for teachers to record a group report or story.

MICROWORLDS

One of the most powerful uses teachers can make of computers is to provide students with a MICROWORLD (a microworld is software with which children play and discover concepts and cause-effect relationships included by the software developer for this purpose), a bridge between hands-on experiences and abstract learning, in which children can learn about a topic through exploration and experimentation (Papert, 1980; 1993). An example is EZ LOGO, which is often used to introduce young children to geometric concepts in a playful way that is intuitive to them, just as one might use blocks to teach size and shape relations. Microworlds are developmentally appropriate

software programs that are harder to find than are drill-and-practice programs, but that are much more valuable.
For example, ODELL DOWN UNDER allows children to explore the ocean's ecological interactions by becoming a fish, with all the abilities and vulnerabilities of the particular species selected. ZOOKEEPER and SAN DIEGO ZOO PRESENTS THE ANIMALS! give students the chance to examine the habitats of several aquatic creatures. Graphics programs, such as COLORFORMS FUN SET provide students with the tools and props to construct their own underwater environment.

TEACHER ROLES IN COMPUTER-ENRICHED CLASSROOMS

1. Instructor
When the computer is introduced into the classroom, an initial learning period occurs during which the children need time to become familiar and comfortable with the technology. It is during this period that the teacher needs to assume the most active role in instructing children, guiding them through new software and encouraging their exploration of the material.

2. Coach

As students gain experience with computers, the focal role held by the teacher gradually diminishes; children are able to perform tasks independently, and peers begin to take over the role of instructor. The teacher then moves into the role of facilitator, providing guidance and support when needed and ensuring appropriate behaviors, while control of the situation remains in the hands of the child.

3. Model

Children will be much more likely to use the computer as a practical, integrated tool for learning if they see the teacher doing the same. Using the computer during whole and small group instruction and for recording stories and producing classroom signs and charts are ways in which the teacher can be a highly visible user of technology.

4. Critic

Responsibilities of the teacher in the computer-enriched classroom begin before the computer is introduced to the students. In providing a rich, challenging, and appropriate learning environment, teachers must take an active role in selecting the software that will truly enhance children's learning and development.

CONCLUSION

Despite revolutionary advances in the field of educational computing, technology remains simply a tool. Potentially powerful and stimulating, the computer is only an inert object that can never be a substitute for the personal touch of the classroom teacher. How teachers implement computer use in their schools is critical. Without proper integration of computers into the curriculum, the benefits of technology to foster children's learning cannot be fully achieved, regardless of the creative potential of any software used.

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